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Empirical Analysis of the Rates of Return Produced by Entrepreneurial Organizations Reaching Initial Public Offering

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Abstract: Successful Entrepreneurial behavior produces economic value. Hence, growth in rates of return informs entrepreneurship expressed as a percentage change in economic value. This paper examines the measurable rates of return produced by instances of entrepreneurial organization. The authors employ data supplied by a NSF grant in a 2004 study produced by John Cochrane of the University of Chicago and a separate study by Michael Ewens, University of California. Data used by Cochrane and Ewens supports evidence that the rates of return on venture capital funds investing in early stage enterprise are significantly greater than returns on investments in mature firms in efficient markets. Furthermore, this study applies said data to the field of entrepreneurship to demonstrate the very high rates of return produced by entrepreneurial behavior during early periods of high growth. Annualized rates of return greater than 500% are reported, supporting the postulate that entrepreneurial organizational behavior can produce extraordinary multipliers in economic value that are substantially greater than the rate produced by mature firms. Empirical evidence of the extent and range of high rates of return are important to both investors and entrepreneurial practitioners as they require nominal expected values to set appropriate goals in business planning.

Key words: entrepreneurship; venture capital; private equity; rates of return
JEL codes: M13, M21, D04

1. Introduction

Within this paper the authors specifically search for the highest rates of return produced over relatively short holding periods generated by investments in high-potential, fast-growing entrepreneurial ventures. The reported results are not intended to describe returns to the average investor investing in the average (non-growth) entrepreneur. Average (non-growth) mean returns are usually not greater than returns available to nominal public equity investments. Shane (2008, p. 103) writes, "… the financial returns that entrepreneurs earn on the capital they invest in their companies… on average… is the same as they would have gotten had they invested their capital in publicly traded stocks." The recent average return on NASDAQ small stocks is about 14.2% (Shane, p. 20). Furthermore, if firm failures and shutdowns are included, the mean return is most likely negative. Shane acknowledges the returns on nominal entrepreneurial activities are low, he continues (p. 106), "The average

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outcome is negative…". Bygrave et al. (1989) also found that the mean return for venture funds were typically below 20%.

Purposely, within the current paper, we examine and report on a specific phenomenon, a category of very high rates of return produced by entrepreneurial organizational activity in the U.S. We employ venture capital investment data results under the assumption that venture capital funding is primarily driven by the expectation of high returns; hence that data is a good source for the intended purpose. Additionally, venture capital investments occur after evaluation in anticipation of the IPO process, additional financing, or acquisition. These professional valuations of economic value are often more credible than informal judgment. The authors acknowledge that high rates of return may likely occur in private closely-held companies as evaluated by private transactions. However, private transaction data is not available.

Within the current paper, we provide answers to many common questions posed by angel investors and students of entrepreneurship. To our knowledge, these research questions have not yet been addressed in the entrepreneurship literature.

These questions are;

(1) "If I am extraordinarily successful as an entrepreneur, how high may my expected rate of return be?"

(2) "How different may be the expected rate of return on capital invested in a hyper-growth company as compared to a non-growing company?"

(3) "What may be the expected rate of return, year by year, over the first five years of life for a fast growing start-up?"

(4) "Should I and my investors approve a business start-up if the expected rate of return is lower than reported comparable returns?"

(5) "If I create a global/national mass-market, fast-growing business, what could my rate of return be to investors?" and,

(6) "What is the appropriate comparable discount rate applicable to expected future cash flows, during the high-growth high capitalization early periods for ultra-growth new firms?"

2. Literature Review

2.1 Rates of Return as an Entrepreneurial Construct

Shane and Venketaraman (2000, p. 219) wrote, "… entrepreneurship does not require, but can include, the creation of new organizations". Wherein they implied that entrepreneurial activity occurs inside or outside existing companies. They continue (p. 223), "research has shown that, on average, entrepreneurs exploit opportunities having higher expected value." Many authors imply the creation of economic value is an important goal to professional entrepreneurs.

Rates of return on investments in ventures are an important construct to experienced entrepreneurs and investors. Koppl (2008, p. 920) writes, "Each entrepreneur makes a computation of prospective profit, whether the computation is explicit, precise, and sophisticated, or implicit and approximate". Although important to experienced entrepreneurs, it is recognized the creation of high growth ventures are not at all a common occurrence for the total entrepreneurial universe. Shane (2008, p. 7) states, "The typical start-up isn't innovative, has no plans to grow, has one employee, and generates less than $100,000 in revenue." Hence, within this study,

we are not reporting on the typical non-innovative, local-market, non-growth start-up. Additionally, we acknowledge super-high rates of return produced by aggressively growing start-ups are very rare events.

Sudek (2006) found "Return on Investment" (ROI) is an important investment criterion. Angel investors ranked ROI as 8th of 25 categories in importance to financiers. Although inexperienced entrepreneurs may not specify the rates of return as a major goal, they specify "continued existence" as a goal, and a firm needs a positive rate of return to be an on-going entity. Hence some moderate level rate of return is specified as important to most entrepreneurs.

2.2 What is Entrepreneurship?

Say (1816) defined the entrepreneur as "...the agent who unites all means of production…" Schumpeter (1934) wrote, "…consists of doing things that are not generally done…" but it was Hull, Bosley and Udell (1980) who were early in focusing on the profit-output criterion when they defined entrepreneurship as, "…organizes and manages a business undertaking assuming the risk for profit."

We propose a construct wherein the quest for higher than nominal rates of return (ROR) may distinguish "entrepreneurial" organization from "small business management" and there exist "classes" of entrepreneurship based on the expected or resultant rates of return.

Within the current study, we do not focus our differentiation on the person or the task, but we evaluate an important prime outcome; the rate in which invested capital is multiplied. Extraordinary rates of return define how successful the entrepreneur was both in capturing the market and fulfilling or creating unmet needs. We recognize rates of return are defined by the speed of success and skill of the organizer as the shorter the time between measurements, the greater the ROR. Hence we propose rate of return would be a valuable construct in distinguishing "management" functions as distinct from the behavior-tasks of entrepreneurship.

Within this study, we define entrepreneurship as the creation of economic organization, in or outside of an existing firm, with the goal of producing rates of return with the practice of management. We further propose extraordinarily high rates of return are produced by an extraordinary level of entrepreneurial intensity and success in reaching that goal is important to most professional and experienced entrepreneurs.

We know of no other paper which answers the central question, what is the rate of return on invested capital produced by the most successful entrepreneurs who create a super-growth, innovative new organization? Hence, to measure and define entrepreneurial activity, we suggest nominal, ex-ante expected and, ex-post actual rates of return are significant defining criterion.

Hence, we formulate,

Ha1:

Rates of return on capital invested in very successful firms in early stages of high-growth are greater than the average SP-500 (Standard & Poor's) stock market return.

Ha2:

Rates of return on capital invested in very successful entrepreneurial firms in early stages of growth are greater than the average NASDAQ stock market for small (< $2m) micro-cap stocks.

Ha3:

Average rates of return on capital invested in early stages with short holding horizons are greater than longer-term investments.

3. Measures

Measurement and reporting of rates of return are problematic as the computational method produces large differences in the result. Returns are based on periodic gains divided by the original value and reported as an arithmetic return. This computation ignores compounding. To incorporate compounding effects, the log return is computed with a continuous compounding effect. An arithmetic return of 1,000% is equal to a log return of 240%. Annualization produces even larger magnitudes of results.

Within this study, we compute and report both arithmetic and log returns. The reported return is proportionally affected by the length of time between measurements. The shorter the holding period between measurements is, the higher the rate of return. The authors maintain the validity of the horizon effect for the measurement and reporting of entrepreneurial output, as most entrepreneurs and investors express a goal of speed to market (execution) and investor's desire for speed to exit (harvest).

Another issue in the measurement of ROR is what value the return is based on. Ideally, the total cashflow output expected to be generated by the firm would be included in the evaluation calculation. Cashflow should include dividends, interest to creditors, salaries, stock options and all other benefits to investors and entrepreneurs. This data is rarely available. We assume present value evaluations capitalize expected future cashflows, at acquisition, or an IPO. The problem with this "late" analysis is the economic value was actually created by entrepreneurial action in a period (wealth-creation period) before the evaluation. We are compelled to use later evaluations as estimations of early-stage value-creation are not available. Hence we employ Cochrane's VentureOne database.

Another computing issue is the effect of annualization. The conversion of short period returns to annual rates greatly increases the resulting figure. For example, a ROR of 10% occurring in one month converts to a 214% annualized ROR. Yet, it would be improper to compare rates of return of unequal holding periods or compare monthly returns to annualized opportunity investments. Hence, we supply annualized rates of return as we propose the reporting and use of returns for short periods are valid goals and concepts for entrepreneurs and their investors.

Within, the arithmetic return is defined:

$$r_{arith} = \frac{V_f - V_i}{V_i}$$

The logarithmic return is a continuously compounded return, defined as:

$$r\log = \ln(\frac{V_f}{V_i})$$

Arithmetic and logarithmic returns are approximately equal for small returns but are very different for larger returns. The difference between them is large when reported values are high. For example, an arithmetic return of +50% is equivalent to a logarithmic return of 40.55%, and an arithmetic return of -50% is equivalent to a logarithmic return of minus 69.31%. However, an arithmetic return of 1,200% is equivalent to a log return of 122%. In other words, continuously compounded growth at 122% produces a 1,200% arithmetic gain in one year.

Logarithmic returns are used in academic research because a continuously compounded return is symmetric while the arithmetic return is not. Positive gains and losses arithmetic returns are not equal. This means an investment of $100 followed by an arithmetic return of 50% followed by an arithmetic return of -50% will result in a balance of $75, while an investment of $100 followed by a logarithmic return of 50% followed by a logarithmic return of -50% yields a balance of $100. Hence, log returns are more "rationally balanced".

It is noted the results reported within this study are rates of returns produced over relatively short holding periods. For example, Ewens (2009, p. 27) converts a 108% non-annualized (short period) rate of return to an 8,548% annualized rate of return. However, these results are considered valid because many investors and entrepreneurs are specifically looking for short holding periods and "quick exits". Quick harvests, cash-outs and opportunities for re-investment are sought by investors. Hence we consider the identification of extreme short-holding-period rates of return a valid construct for the field of entrepreneurship. Even though the process of annualization produces extra-ordinary results, we report these rates within this study as they highlight the magnitudes of capital multiplication.

4. Methodology

4.1 Source of Data

Cochrane (2004) results are obtained from the 1987 to 2000 VentureOne database comprising 7,765 companies wherein the mean return, standard deviation, and other parameters of early-stage companies whose economic value is evaluated by IPO, acquisitions or obtains new financing. Cochrane states these data are highly selection-biased, as only survived firms are included. Investments that exhibit high growth are more likely to attract additional capital and go to IPO. Investments which do not exhibit growth are most likely shut-down, and are not included in the database. Hence, Cochrane applies a correction factor in effort to eliminate self-selection bias to determine the average rates of return for all venture capital investments acting as if losses are included. However, for use in the present study, as we only test for extremely high rates of return, we use the present feature of self-selection to advantage.

Cochrane (Table 6) reports very high rates of return. Rates of return are measured over periods from investment to investment when the firm's value can be evaluated by a market. Without correcting for selection bias, he reports mean log returns of 108% (SD 135), mean arithmetic return of 698% (SD 3,282%). He writes, (2004, p. 3) "The distribution is highly skewed: there are a few returns of thousands of percent, many more modest returns of only 100% or so, and a surprising number of losses". He continues, "I find a sample of very small NASDAQ stocks in this time period has similarly large mean arithmetic returns, large, over 100%..." Students of entrepreneurship expect acts of entrepreneurial venture are risky but success can create wealth as a ROR of 689% multiplies investments by a factor of seven.

The shorter the holding period, the higher the annualized rate of return is. Annualized gains of $100 on a $1,000 investment are 10% if the holding period is a year but 214.29% if the gain occurs in one month. Cochrane agrees (2004, p. 20) stating, "... a mild 100% return, but that happens in two weeks, the result is a $100 \times (2^{24} - 1) = 1.67 \times 10^9$ percent annualized return. Even though the use of short holding periods produces extremely high rates of return, they are not invalid in the context of the present study as the process of venture investment and entrepreneurship are specifically motivated.

We suspect most investors and entrepreneurs would be quite pleased by 1,670,000,000% rate of return occuring in two weeks vis-a-vis a 100% over one year. Very rapid investment and exit cycles in businesses such as Facebook, Google or E-Bay are a goal, not a simple by-product of the professional entrepreneur and investors operating with an IPO as an exit strategy. The issue is discussed by Cochrane (p. 8) "A few projects with 'normal' returns in a very short time have astronomical annualizes returns."

5. Results

From Cochrane's (2004) data, we report rates of returns without a sample selection correction. Cochrane states (p. 20), "These must be the highest average returns ever reported in the finance literature..." From the data, we report the twenty highest arithmetic rates of return in Table 1. Holding periods between evaluations are also reported.

Table 1 Twenty Highest Rates of Return 1987-2000 Venture One Database

Rank	Company	Arithmetic Return	Annualized Return	Log Return	Log Ann. Return	Holding Period (days)
1	Yahoo	136,738%	122,249%	722%	711%	371
2	Juniper Networks	76,209%	792%	664%	219%	1,108
3	FreeMarkets	65,784%	505%	649%	180%	1,317
4	Cerent	42,080%	1,062%	604%	245%	900
5	Steel Dynamics	28,878%	12,651,064+E6%	567%	2,556%	81
6	Redback Networks	22,042%	672%	540%	204%	965
7	Qtera	18,573%	5,525%	523%	403%	474
8	Selectica	17,452%	406%	517%	162%	1,164
9	Portal Software	16,119%	411%	509%	163%	1,139
10	Data Critical	15,528%	117%	505%	77%	2,387
11	Scient	14,689%	3,266%	500%	352%	519
12	Exodus Communications	13,202%	1,044%	489%	244%	733
13	Oni Systems	13,107%	605%	488%	195%	913
14	ACLARA BioSciences	12,793%	170%	486%	99%	1,786
15	Covad Communications	12,788%	1,826%	486%	296%	600
16	Ciena	12,150%	446%	481%	170%	1,035
17	Ariba Technologies	10,406%	448%	465%	170%	999
18	VA Linux Systems	10,189%	5,982%	463%	411%	412
19	eToys	9,900%	2,233%	461%	315%	534
20	Actuate Software	9,874%	171%	460%	100%	1,689

Note: * From Venture One database 1987-2000, Cochrane J. (2004) http://gsbwww.uchicago.edu/fac/john.cochrane/research/Papers/.

Clearly, successful entrepreneurship in ventures exhibiting potential hyper-growing yields fantastic growth in economic value occurring over very short holding periods, yielding very high calculated rates of return. Yahoo's non-annualized log returns of 711% are extremely high with an arithmetic return of 136,738%. A $1 investment produced a gain of $1,367 in just over one year's time.

In Table 2, we present summary annualized arithmetic, log returns and medians of all 3,595 firms.

Table 2 Annualized Mean Observed Rates of Return of Firms Reaching IPO or Acquired, N = 3,595 ALL AGES*

Arithmetic Return:	698%
SD:	3,282%
Annualized Arithmetic Return:	3,700,000,000%
SD:	220,000,000,000%
Arithmetic Median:	184%
Log Return:	108%
SD:	135%
Annualized Log Return:	72%
SD:	148%
Log Median:	105%

Note: * Cochrane (2004), Table 6, P.40. All holding investment periods.

We conclude extreme rates of return exist for successful (surviving) and well-financed ventures. These are important results for business planning, investors and students of entrepreneurship.

These data answer a student's frequent question; "what financial result can I expect if I am highly successful in organizing an innovative, fast-growing firm?" Clearly, capital can be multiplied at rates exceeding 10,000% in less than one-year's time.

The results demonstrate the possibly of extreme rates of return on capital invested in entrepreneurial ventures. Results give investors some indication of expected rates of return when they decide to fund a fast-growing, highly successful firm.

5.1 Non-parametric Tests of Return Means

Non-parametric tests are used when the underlying assumption of normality in parametric tests (t-test) is violated. Here, an alternative to the two-sample Student's t-test is the Mann-Whitney U-test. This test is used to compare medians of two non-normal distributions.

5.2 Hypothesis 1

To test whether the rates of return of firms in the database are greater than the average monthly rate of return of the Standard & Poor's return, we compare the truncated Venture One data set consisting of 3,595 annualized data points and compare them to the similarly annualized monthly returns of the S&P-500 index.

U-Test (Mann-Whitney) Returns of Venture One Entrepreneurs vs. S&P-500

	N	Mean Rank	U
Annualized ROR Venture-One (3,595 data points)	3,595	1922.201947	446506
Annualized Monthly ROR SP-500	185	1274.454054	218569
	Z	P	
	-7.87293754	3.55271E-15	

The reported small P value supports the hypothesis the average annualized returns of very successful entrepreneurs are greater than efficient public market returns; therefore we do not reject Ha1.

Ha1 is not rejected at $p < 0.01$ as the average log annualized arithmetic rate of return of 73% produced by very successful entrepreneurial firms is significantly greater than the 14.2% annualized arithmetic returns produced by the NASDAQ small firm market.

5.3 Hypothesis 2

Comparing the final annualized VentureOne database to the annualized monthly NASDAQ micro-cap (< $2m) returns over the same period.

U-Test (Mann Whitney)

	N	Mean Rank	U
NASDAQ Monthly Annualized ROR	216	1354.532407	269143
Venture One Data Annualized ROR	3,595	1939.134075	507377
	Z	P	
	-7.584231868	3.35287E-14	

Ha2 is not rejected as the reported small P value supports the hypothesis the average annualized returns of very successful innovative-early-stage, high-growth companies are greater than the NASDAQ market.

5.4 Return by Age of Investment

From Cochrane's data we investigate Rates of Return by the age of the investment in Table 3.

Table 3 Observed Rates of Return of Firms Reaching IPO or Acquired by Age Bin*

	1-6mo	6-12mo	1-2yr	2-3yr	3-4yr	4-5yr
AAR:	4.0e+10%	1,200%	373%	99%	62%	38%
ALR:	201%	122%	73%	52%	39%	27%
N:	334	476	877	706	525	283

Note: *Cochrane (2004, Table 6, p. 40).

These data are presented in Graph 1 showing Cochrane's average Log rate of return by investment age bin. The rates shown support the idea significant wealth is created in the earliest stages of growth.

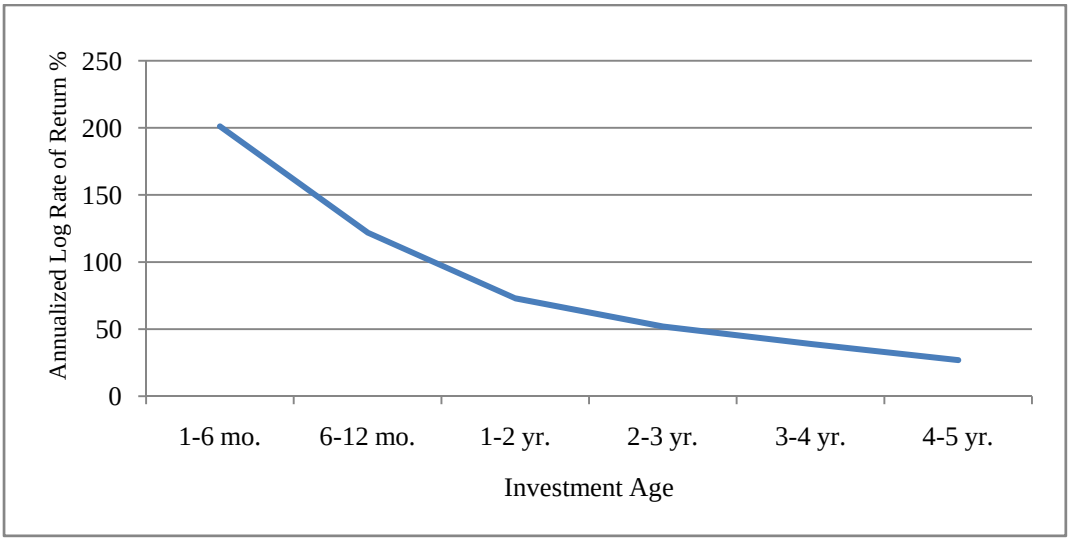

Figure 1 Average Log Rate of Return of IPO/Aquired Firms by Investment Age

5.5 Hypothesis 3

We conducted paired U-Tests of the 1-6 month age investments compared to age bin 6-12 months, and tested the 6-12 month average compared to the 1-2 year age bin, followed by the 1-2 year bin compared to the 2-3 year, the 2-3 year bin compared to the 3-4 year bin and finally the 3-4 year bin compared to investments lasting 4-5 years.

U-Test (Mann-Whitney) 1-6 month vs. 6-12 month investment

	N	Mean Rank	U
1-6 mo.	331	443.2114804	91757
6-12mo.	473	374.0105708	64806
	Z	P	
	4.158081587	3.20931E-05	

U-Test (Mann-Whitney) 6-12 month vs. 1-2 year investment

	N	Mean Rank	U
6-12 mo.	473	786.1501057	259748
1-2 yr.	873	612.465063	153181
	Z	P	
	7.826397154	5.10703E-15	

U-Test (Mann-Whitney) 1-2 year vs. 2-3 year investment

	N	Mean Rank	U
1-2 yr.	873	841.486827	353117
2-3yr.	703	722.6998578	260602
	Z	P	
	-5.150769944	2.59419E-07	

U-Test (Mann-Whitney) 2-3 year vs. 3-4 year investment

	N	Mean Rank	U
2-3 yr.	703	653.0611664	211646
3-4 yr.	523	560.3231358	156023
	Z	P	
	-4.535908115	5.73561E-06	

U-Test (Mann-Whitney) 3-4 year vs. 4-5 year investment

	N	Mean Rank	U
3-4 yr.	523	429.3785851	87539
4-5 yr.	282	354.0780142	59947
	Z	P	
	-4.383296909	1.16897E-05	

The reported small P values support the hypothesis the average annualized returns of each age-bin categories are sequentially greater and statistically significant than the next older age group.

H3 is not rejected at $p < 0.01$ as the rate of return of very successful entrepreneurial shorter-aged investments are statistically greater than rates produced by longer-term investments.

Ewens (2009) results demonstrate similar rates of returns. He writes (p. 2), “Extreme outcomes characterize venture capital (VC) returns. Complete capital loss is common...”, “Confident in the accuracy of observed extreme returns, I must address tail events...” Here, he indicates non-normal distributions and non-normal fat-tails.

Ewens used the 1987-2007 VentureOne database maintained by a Dow Jones subsidiary which covered 15,000 entrepreneurial firms. He computed returns computed in no less than a one month holding period. Ewens acknowledges the self-selection problem of survival reporting. Ewens’ results (p. 27) are presented in Table 4.

Table 4 Investment to Investment Returns, Non-bankruptcies *

Annualized Arithmetic Return:	8,548%
SD: 836,267%	
Log of the Annualized Return:	62%
SD: 130%	
N= 10,354	

Note: * Ewens (2009, p. 27, Table 6).

Ewens results support Cochrane. Ewens (2009, p. 13) writes, “Both arithmetic and log returns are large. Annualization has a dramatic impact on mean arithmetic returns, with an average of 8,548%.” Again, these results do not include bankruptcies because our purpose is not to determine VC fund results but rates of return results produced by specific successful ventures.

6. Discussion

The ex-ante rate of return is an important construct for entrepreneurship. The rate of return is the rate of growth between economic evaluations, and evaluations are based on the present value of all expected future cash flows to be generated, the expected rate of return indicates the expected multiple the invested capital is expected to grow. The construct of rate of return is, in and of itself, an important indicator of many other constructs which are important to entrepreneurship. Rate of return is an indicator of; the expected size of the market, margins to be generated, viability of the opportunity (risk), speed to capture the market, extent of market penetration, expected sales revenue, expected cash flows, and the durability of the venture. Rates of Return are an inverse indicator of the amount of resources required to capture a market. The more "capital-efficient" the venture is, the higher is the ROR. Therefore, rate of return is important in informing entrepreneurship. The ex-ante return demonstrates how successful the entrepreneur was.

The entrepreneur and investor should calculate the expected rate of return from pro-forma financial statements and evaluate if the venture is worth the time and risk. An explicitly low rate of return yield may indicate a start-up is not advised or the business model, business plan and approach to the market should be revised. An explicitly high expected return could be valuable to attract investors.

Hence, it appears a fast-growth, innovative, start-up should generate in excess of 1,000% on capital. This expectation differs from the yields promised in most business plans where returns to investors are a nominal 30%-40% rate.

The authors acknowledge growth and high rates of return are often not important goals for the typical non-professional U.S. entrepreneur. This is indicated because most entrepreneurs enter highly competitive, saturated, non-growth markets, employing no innovation and no intentions of growth. Shane (2008, p. 65) states, "The data show that almost all new businesses produce the *same* products and services as existing businesses, and almost none of them provide a product or service that their founders views as unique… Most new businesses don't intend to do something innovative… only 2 percent of new business founders *expect* their companies to have a substantive effect on the markets in which they operate…". Clearly the phenomenon of high-growth, high rate of return venture is a small portion of all new businesses. Shane (p. 93) continues, "… most informal, nonaccredited investors in start-ups aren't very interested in achieving high financial returns. In fact, one study found that more than one-third (35 percent) of informal investors expect no return… on their investments in start-ups".

In this study, we assume the professional venture capital investor and aggressive entrepreneurs are much more likely to identify and invest in the 2-3% of firms having founders who expect high-growth and demand high rates of return. This validates the use of venture capital data returns in identifying super-high extraordinary rates of return. Again, this sub-set is quite small, as Shane (2008, p. 90) states, "… venture capitalists make investments in about 3,000 companies each year, of which only about 500 are start-ups… venture capitalists finance less than 0.03 percent of all new businesses… each year."

The rates of return produced by privately-held ventures may be greater than those reported within this study. Entrepreneurs are slow to disclose private valuation results as public disclosure may invite scrutiny from IRS or family interests. Also, a very successful private firm that can self-finance or find private equity may not disclose for fear of attracting additional competitors to the market.

We conclude a fat left-tail with many 100% losses and hyper "gazelle" type entrepreneurial success a rarity.

The question may be answered; extreme entrepreneurship is a separate rare phenomenon with returns exceeding 1,000% for short initial investments.

7. Conclusions

Very high rates of return in excess of 500% are reported for new ventures. The construct of rate of return is an important indicator of entrepreneurship. Ultra-successful entrepreneurship yielding very high rates of return are rare events. Less than 2% of professional investors in new start-ups are successful in producing these ultra-high rates of return. Shane (2008) writes that these hyper-return events are rare and likely less than 1% of all start-up entrepreneurial ventures.

The reported rates of return results are quite large. The reported results are supported by more than one calculation from more than one study. Nominal rates of return are in all likelihood higher than reported within this study because of the under-reporting of private investment which do not become public.

Empirical evidence was noted that the very early stages with short-term investment ages produce returns greater than older investments. Results suggest successful entrepreneurial activity is rare and national mass-market innovative ventures surviving and reaching acquisition harvest or IPO are less than 2.5% of all ventures. However, it appears surviving successes can multiply capital at rates exceeding 500% and these instances are significantly different than the mean for public markets.

We find evidence there are "classes" or categories of entrepreneurship, wherein the rates of return of 500% are different than the nominal 20% produced by family non-growth businesses.

Cochrane (2004, p. 8) states "A few projects with "normal" returns in a very short time have astronomical annualized returns... a small number of observations... get a huge positive or negative return...". Clearly there is a goal and hope for the creation of wealth by lucky or skilled entrepreneurs.

Further study could include an analysis of returns produced by privately-held firms that never become public and an analysis of return-data by nationality.

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